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which would not otherwise have been vaporized. Furthermore, it is quite possible that the comet, in moving around the sun, entangles itself in the stream of material driven from the sun and varies in its effects in accordance with its being or not being in a solar streamer more or less dense for the time being, speaking relatively. It is easily conceivable that an assumed stratification of space may be a cause of variations of comet's tail brightness. Putting it more properly, it is conceivable that a comet may act as an indicator of the condition of space around the sun, the space in which the comet, for the time being, is moving. Even under the idea that there is volatile matter emitted from the sun which ordinarily would not be visible, let such matter strike into the nucleus of a comet and meet matter from the comet itself; it is easily seen that interactions, electrical or otherwise, or even physical collisions, may add to the light of a comet's tail.

The chief point, however, which I have endeavored to emphasize by the comparisons above made, is the excessive tenuity of the matter which would be sufficient to give rise to a brilliant appendage to a comet and the exceedingly small amount of volatile matter needed. This fact renders it possible that the comet may, in the lapse of many years, replenish itself in the depths of space and may account for the fact that at each return, even to close proximity to the sun, a tail is developed. Otherwise, since the matter of the tail certainly does not return to the comet, it would seem that the volatile matter would be distilled off and lost in a very few perihelion passages.

ELIHU THOMSON

ROBERT PARR WHITFIELD

PROFESSOR ROBERT PARR WHITFIELD died on April 6 at Troy, N. Y., in his eighty-second year.

Professor Whitfield's association with the progress of paleontological science in the United States has placed his name permanently among the pioneers of that science in

this country. His work, however, has no anti-quarian interest merely. From the first it was forcible, careful and convincing. Throughout the long period of his connection with the American Museum of Natural History he industriously contributed papers on invertebrate paleontology, to the publications of that institution, while his work on the surveys of Ohio, Wisconsin and New Jersey was persistently prosecuted, in reports of great value, distinguished always by keen morphological discrimination.

His work began with his employment on the New York State Survey, where he assisted Professor James Hall, who was then engaged in his studies of Paleozoic fossils. Professor Whitfield's assistance was at first in the nature of exact preparatory analyses of the copious material offered for examination, classification and description. About this time he produced the beautiful illustrations of graptolites which gave distinction and an unusual interest to the decades of the Canadian Survey, and his painfully minute study upon which superinduced a, fortunately, only momentary, danger to his eyesight. He continued his labors on the survey until 1877, and helped materially to give precision and a broad zoological basis of comparison to the reconstructions of the invertebrate life of the past, in the papers and volumes, written by Professor Hall, not only upon the paleontology of New York, but of western states as well. His studies of the internal loops of various genera of brachiopoda, his delineation of the muscular scars of lingula and his rearrangement of the crinoidal scheme of plates were all very helpful. Succeeding this came his admirable descriptive papers published in the geological reports of Wisconsin and Ohio. Then followed an exhaustive examination of the upper Devonian lamellibranchs, the results of which were embodied in the subsequent New York survey volumes on these shells.

When the great Hall collection of fossils came into the possession of the American Museum, Professor Whitfield was invited to take charge of this extraordinary cabinet, to

install, arrange and label it. It would have been impossible to have found any one so well qualified for this task; he seemed to recognize every specimen as it was unpacked and each one became the text of pleasant or exciting memories.

It was not long after Professor Whitfield's assumption of this important charge that the publication of the *Bulletin* of the American Museum was begun, and paleontological papers from his pen appeared upon its pages. It is quite unnecessary to review all of these; they consisted of descriptions of new species, genera, revisions, notes, emendations and figures of hitherto unfigured species, and original identifications and discussions. Perhaps the most important were his descriptions of the fossils of the Fort Cassin beds in Vermont, his admirable treatment of the subject of *Uphantaenia* and *Dictyophyton*, referring these problematic bodies to sponges, a position firmly established by later observations, his detection of a fossil scorpion in the Waterlime beds of New York, his papers on Cretaceous Syrian fossils, on fossil marine algæ, on the Cretaceous Rudistæ of Jamaica and his review of the anomalous genus *Barrettia* from the same island. He occasionally intercalated in these fossil studies a paper upon living forms, as his experimental observations upon *Lymnea megasoma*, a new sponge from Bermuda and a new coral from the Bahamas.

He completed during these years his great work on the fossils of the Cretaceous and Tertiary of New Jersey, a work achieved under very serious difficulties, and with most fragmentary and insufficient material. These memoirs were published by the U. S. Geological Survey. The genus *Whitfieldia*, a member of the meristelloid brachiopods, was named by Professor Davidson after him, and his name as a specific designation appears up and down the pages of paleontographical literature. Unostentatious, of a reserved, almost severe demeanor, animated by an intense love of his science, his life was passed peacefully and pleasantly, amid unruffled domestic relations, in unbroken association

with the objects of his conscientious and unremitting study.

L. P. G.

CONFERENCE ON AGRICULTURAL NATURE-STUDY

THE conference on the teaching of agriculture in the common schools of Illinois was held from March 24 to 26, an enthusiastic session at the University of Illinois at Urbana. This was the first meeting of its kind in the United States, and educators from all over the state of Illinois and neighboring states took part in its sessions. Among those present were D. J. Crosby, U. S. Expert in Agricultural Educational Work, Washington, D. C., and representatives of railroads, members of agricultural faculties from neighboring states, members of the legislature, county superintendents, normal school faculties, farmers' institute officials, rural school directors, domestic science leaders, manual training leaders, practical farmers and land owners, technical men, college and university professors, state departments of public instruction.

The conference was inclined to move slowly along this new line of activity. It took, however, two or three steps that are destined to be very important in the educational work of the schools of the state. It was strongly urged that a course of study in agriculture be planned for the elementary schools of the state. A committee was appointed for this purpose consisting of Professor Fred. L. Charles, University of Illinois; County Superintendent McIntosh, Monticello, Illinois; Miss Alice J. Patterson, State Normal University, Normal, Ill.; Assistant State Superintendent, U. J. Hoffman, Springfield, Ill.

It was arranged that a second meeting of the conference be held next year in connection with the agricultural short course at the University of Illinois, when something over a thousand people of the state will be assembled to study agriculture in its various phases.

The following standing committee was ap-